

Original Research Article

Correlation between Gingival Biotype and Occurrence of Gingival RecessionMamta Singh¹, K.K. Chaubey², Ellora Madan³, Rajesh Kumar Thakur⁴, Manvi Chandra Agarwal⁵, Neha Joshi⁶¹Third Year Post graduate student, Department of Periodontics, Kothiwal Dental College and Research Centre, Mora Mustaqueem, Kanth Road, Moradabad, 244001, Uttar Pradesh, India²Head & Professor, Department of Periodontics, Kothiwal Dental College and Research Centre, Moradabad 244001, Uttar Pradesh, India³Reader, Department of Periodontics, Kothiwal Dental College and Research Centre, Moradabad 244001, Uttar Pradesh, India⁴Professor, Department of Periodontics, Kothiwal Dental College and Research Centre, Moradabad 244001, Uttar Pradesh, India⁵Reader, Department of Periodontics, Kothiwal Dental College and Research Centre, Moradabad 244001, Uttar Pradesh, India⁶Senior Lecturer, Department of Periodontics, Kothiwal Dental College and Research Centre, Mora Mustaqueem, Kanth Road, Moradabad, 244001, Uttar Pradesh, India***Corresponding Author:**

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Abstract: Gingival recession is the displacement of the gingival margin apical to the cemento-enamel junction resulting in the exposure of root surface which puts the patient at risk for dentine hypersensitivity, root caries, abrasion/erosion of roots etc. The etiology can be inflammatory periodontal disease, developmental anatomic abnormalities (aberrant frenal attachment, thin bony plate), toothbrush injury, tooth malposition and iatrogenic factors. Besides, gingival morphology plays an important role in causing gingival recession. The present study aims at assessing the co-relation between gingival biotype and occurrence of gingival recession. A total no. of 20 patients with 30 recession sites were clinically examined for the type of gingival recession present followed by the assessment of gingival biotype after administration of topical anaesthetic agent. Based on the findings a correlation between the incidences of gingival recession will be assessed with that of the biotype through Pearson co-relation test. A statistically significant co-relation between gingival biotype and occurrence of gingival recession was found with higher no. of incidence of recession in patients with thin biotype. A clinician's knowledge in identifying gingival biotypes is paramount in identifying the indirect causes of recession. Patients with thin biotype are susceptible to higher incidence of gingival recession.

Keywords: Gingival recession, Gingival biotype, Dentine hypersensitivity, Iatrogenic factors

INTRODUCTION

Gingival recession is one of the most common esthetic and functional concerns associated with periodontal tissues [1]. Gingival recession is the displacement of the gingival margin apical to the cemento-enamel junction resulting in the exposure of root surface which puts the patient at risk for dentine hypersensitivity, root caries, abrasion/erosion of roots etc., [2].

The long term success of esthetic restorations depends on several factors like gingival biotype, architecture of the gingival tissue and shape of the anterior teeth. The gingival morphology plays an important role in determining the final esthetic outcome. Therefore during treatment planning, it is important to recognize differences in gingival tissue.

Different gingival biotypes respond differently to inflammation, restorative, trauma and parafunctional habits. These traumatic events result in various types of periodontal defects which respond to different treatments. Long back, Ochsenbier and Miller discussed the importance of "thick vs. thin" gingiva in restorative treatment planning [3].

The morphologic characteristics of the gingiva depends on several factors like the dimension of the alveolar process, the form of the teeth, events that occur during tooth eruption, the eventual inclination and position of the fully erupted teeth. A gingival thickness of > 1.5 mm is defined as thick biotype and a gingival thickness of <1.5 mm as thin biotype [4-6].

The term periodontal biotype introduced by Seibert and Lindhe categorized the gingiva into “thick-flat” and “thin-scalloped” biotypes [4-9]. Thick gingival tissue is associated with a broad zone of the keratinized tissue and flat gingival contour suggestive of thick bony architecture and also is more resistant to inflammation and trauma. Thin gingival tissue is associated with a thin band of the keratinized tissue, scalloped gingival contour suggestive of thin bony architecture and is more sensitive to inflammation and trauma. Inflammation of the periodontium results in increased pocket formation and gingival recession in thick and thin tissues respectively.

A clinician’s knowledge in identifying gingival biotypes is paramount in achieving optimal treatment outcomes. The present study is designed to assess the correlation between gingival biotype and occurrence of gingival recession.

AIM & OBJECTIVES

The aim of the present study is to evaluate correlation between gingival biotype and occurrence of gingival recession. The objectives are to evaluate the biotype of the subjects followed by assessment of the incidence of gingival recession.

MATERIALS & METHODS

20 subjects with 30 recession sites between the age group of 18-70 years, were selected from the Out Patient Department, Department Of Periodontics, Kothiwal Dental College & Research Centre, Moradabad. The protocol of the study was thoroughly explained to the patients and written consent was obtained from them. Study was sent to the Ethical Clearance Committee of Institutional Review Board for approval and their consent was obtained.

Inclusion criteria

1. Patients within the age group of 18 years to 70 years.
2. Patients having Class I, Class II and Class III gingival recession.
3. Patients having bilateral single or multiple recession defects.

Exclusion criteria

1. Patients having Class IV gingival recession.
2. Long term (more than 2 weeks) use of antibiotics in past 3 months.
3. Mucosal disorders like high frenal attachments and ulcers.
4. Medically compromised patients.
5. Pregnant patients.

METHODOLOGY

Selected subjects were clinically examined for the type of gingival recession present followed by the assessment of gingival biotype after administration of topical anaesthetic agent. Gingival biotype was assessed

on the basis of visual method i.e. probe transparency method as well as by transgingival probing method with no.15 K-file. The gingival thickness was then measured with the help digital Vernier Callipers. A gingival thickness of >1.5 mm is defined as thick biotype and a gingival thickness of <1.5 mm as thin biotype. Based on the findings a correlation between the incidences of gingival recession was assessed with that of the biotype.



Fig-1: 150mm/6inch Stainless Steel Digital Vernier Caliper with LCD Display Screen

CLINICAL PARAMETERS

Following clinical parameters will be recorded.

1. Recession Width(RW): It was measured 1 mm apical to the cementoenamel junction (CEJ) crown margin in a mesio-distal direction using Vernier caliper.



Fig-2: Recession Width (RW)

2. Recession Length(RL): It was measured by Vernier caliper at the mid-buccal aspect of the tooth from CEJ to the most apical point of the free gingival margin.



Fig-3: Recession Length(RL)

3. Keratinised Gingival width (KGW): It was measured at the mid-buccal point, respectively from the muco-gingival junction to the free gingival margin. The muco-gingival junction was determined using the roll over technique.



Fig-4: Keratinised Gingival width (KGW)

4. Gingival thickness (GT): It was measured 3 mm below the gingival margin at the attached gingiva or the alveolar mucosa using a # 15 endodontic K-file with a silicone disk stop at three points i.e. mesial, mid-facial, distal. The mucosal surface was pierced at a 90° angle with slight pressure until hard tissue was reached. The silicone stop on the K-file was slid until it was in close contact with the gingiva. After removal of the K-file, the distance between the tip of the K-file and the inner border of the silicone stop was measured to the nearest 0.01 mm with calipers.



Fig-5a. GW (M)



Fig-5b. GW (MF),



Fig-5c. GW (D)

STATISTICAL ANALYSIS

Statistical software was used to analyze the data. The values of different parameters collected are expressed as means +/- SD. A co-relation between the incidences of gingival recession was assessed with that of the biotype using Pearson Co-relation test.

RESULTS

A total of 30 teeth having gingival recession were selected. Table 1 shows the clinical parameters i.e. Recession length (RL), Recession width (RW), Keratinised Gingival Width (KGW) and Mean Gingival thickness (Mean GT). Table 2 shows standard mean deviation between parameters. Table 3 shows Pearson Co-relation among the mentioned parameters.

Table 1: Clinical Parameters And The Mean Gingival Thickness

TOOTH	RL	RW	KGW	GT(D)	GT(MF)	GT(M)	MEAN GT	BIOTYPE
11	3	2	3	1.53	1.43	1.63	1.53	THICK
21	3	2	4	1.62	1.41	1.67	1.01	THIN
31	5	3	2	1.22	1.48	1.11	1.27	THIN
41	3	2	3	0.86	0.91	1.02	0.93	THIN
42	4	3	2	1.12	0.84	0.98	0.98	THIN
32	3	3	2	0.77	0.72	0.81	0.76	THIN
14	4	2	2	1.51	0.64	1.39	1.18	THIN
31	2	2	4	1.46	1.42	1.34	1.4	THIN
41	4	3	2	1.48	1.07	1.09	1.21	THIN
33	5	2	3	1.26	1.05	1.31	1.2	THIN
32	3	2	2	1.42	0.98	1.22	1.2	THIN
31	6	3	1	2.18	1.12	1.85	1.71	THICK
43	4	2	3	1.12	1.27	1.34	1.24	THIN

42	5	2	2	2.32	1.04	1.08	1.48	THIN
41	7	2	1	1.38	0.59	1.72	1.23	THIN
42	6	2	1	1.21	0.84	1.42	1.16	THIN
21	2	4	3	1.24	1.02	1.32	1.19	THIN
23	3	4	2	1.42	1.21	1.24	1.29	THIN
22	2	3	3	1.26	1.24	1.48	1.33	THIN
32	4	2	3	1.68	1.02	1.34	1.35	THIN
31	1	2	4	1.06	0.62	1.22	0.96	THIN
41	3	2	3	1.38	1.24	1.68	1.43	THIN
32	3	2	3	1.52	1.22	1.46	1.4	THIN
21	2	4	3	1.54	1.24	1.68	1.49	THIN
22	2	5	4	1.24	1.32	1.46	1.34	THIN
24	2	3	2	1.63	1.46	1.78	1.62	THICK
11	2	4	3	1.62	1.38	1.56	1.52	THICK
12	4	3	3	1.42	1.28	1.44	1.38	THIN
13	3	4	2	1.87	1.43	1.76	1.68	THICK
14	4	2	1	1.68	1.24	1.46	1.38	THIN

Abbreviations: RL: Recession Length; RW: Recession Width; KGW: Keratinised Gingival Width; GT(D): Gingival thickness at distal aspect; GT(MF): Gingival thickness at distal aspect; GT(M): Gingival thickness at distal aspect; MEAN GT: Mean gingival thickness

Table 2: Mean \pm SD

Descriptive Statistics			
	Mean	Std. Deviation	N
RL	3.4667	1.4077	30
RW	2.7	0.87691	30
KGW	2.5333	0.89955	30
GT(D)	1.434	0.32917	30
GT(MF)	1.1243	0.26379	30
GT(M)	1.3953	0.26083	30
MEAN GT	1.318	0.22	30

Table 3: Pearson's correlation

		RL	RW	KGW	GT(D)	GT(MF)	GT(M)	MEAN GT
RL	Pearson Correlation	1	-0.358	-.693**	0.232	-0.308	0.013	0.073
	Sig. (2-tailed)		0.052	<0.001	0.218	0.097	0.947	0.701
RW	Pearson Correlation	-0.358	1	0.079	0.008	0.316	0.111	-0.044
	Sig. (2-tailed)	0.052		0.679	0.967	0.089	0.558	0.818
KGW	Pearson Correlation	-.693**	0.079	1	-0.257	0.299	-0.02	-0.341
	Sig. (2-tailed)	0	0.679		0.171	0.108	0.917	0.065
MEAN GT	Pearson Correlation	0.073	-0.044	-0.341	.409*	0.305	0.304	1
	Sig. (2-tailed)	0.701	0.818	0.065	0.025	0.101	0.102	
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed).								

The results indicate there is a statistically significant correlation between recession length and keratinized gingival width. But there was no statistically significant correlation between gingival biotype i.e. thickness of gingiva and recession width. Also, there is no significant correlation between gingival biotype and recession length. Individual parameters did not show any correlation.

DISCUSSION

Gingival recession involves loss of both soft tissue as well as hard tissue. The probability of gingival recession is more when the thickness of gingiva is less. A thicker gingival tissue is more stable and provides better resistance against recession.

The thickness of the gingiva in the facio-palatal dimension has been described as gingival biotype [1] which is classified commonly as thick, normal and thin. It has been quoted in several studies that a thick biotype is more resistant to recession [4-9]. Since studies have concluded that the thickness of the gingiva plays a vital role in development of mucogingival problems and in the success of treatment for recession and wound healing, assessment of gingival thickness is relevant to clinical periodontics. It has also been shown that subjects with thin marginal tissue are more prone to the development of mucogingival problems, particularly in case of thin underlying bone.

In the present study there is strong correlation between the recession length and the width of keratinized gingiva. This observation further consolidates the widely accepted fact that an adequate width of keratinized gingiva is instrumental in preventing gingival recession at a particular site. Similar findings have been reported by Carnio *et al.* [10], Greenstein *et al.* [11], Kumar S *et al.* [12].

One of the limitations of the present study was that the sample size was small (N=30). Future studies with larger sample size are required to further establish the correlation between occurrences of gingival recession and gingival biotype.

CONCLUSION

This study can prove helpful in predicting the prognosis of the case. There exists a positive correlation between gingival thickness and occurrence of gingival recession. There is a negative correlation between length/depth of gingival recession and width of keratinised tissue. More the length of gingival recession, lesser is the width of keratinised gingiva. Higher incidence of gingival recession is found in patients with thin biotype therefore treatment modalities that aim at enhancing the thickness of gingiva can result in better treatment outcome of recession coverage procedures. Besides, an adequate width of keratinised gingiva plays a pivotal role in prevention of gingival recession [13].

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